# INTERMOUNTAIN POWER SERVICE CORPORATION

April 4, 2001

Richard Sprott, Director
Division of Air Quality
Department of Environmental Quality
P.O. Box 144820
Salt Lake City, UT 84114-4820

Dear Director Sprott,

**NOTICE OF INTENT: Modification of Source**

Intermountain Power Service Corporation (IPSC) is hereby submitting a Notice of Intent (NOI) to increase generating capacity at the Intermountain Generating Station (IGS) in Delta. The IGS is a coal fired steam-electric plant located in Millard County, a NAAQS Attainment Area. Specifically, IPSC intends to construct modifications to Units One and Two at IGS to enhance performance and reliability and to allow increased capacity by de-bottlenecking certain aspects of our operation. This NOI requests an approval order to construct and a revision to IPSC's Title V permit to incorporate these modifications.

As required by UAC R307-401-2, the following information is provided:

**(1) PROCESS DESCRIPTION:** IGS is a fossil-fuel fired steam-electric generating station that primarily uses coal as fuel for the production of steam to generate electricity (SIC Code 4911). Both bituminous and subbituminous coals are utilized. Fuel oil and used oil are also combusted for light off and energy recovery.

IGS is a two unit facility operating at a rated capacity of 875 megawatts (MW) per unit (gross). Approximately 5.3 million tons of coal and 600,000 gallons of oil (including used oil) are used each year in the production of electricity. Boiler capacity is rated at 6.2 million pounds per hour of steam flow at 2822 psi.

IGS has in place bulk handling equipment for the unloading, transfer, storage, preparation, and delivery of solid and liquid fuel to the boilers. No changes of this equipment are proposed. No changes in the usage of other raw materials or bulk chemicals are planned.

850 West Brush Wellman Road. Delta. Utah 84624 / Telephone: (801) 864-4414 / FAX: (801) 864-4970

**PROPOSED CHANGES:** IPSC is planning to enhance steam flow characteristics through the high pressure (HP) section of each turbine used to generate electricity. This involves the replacement of the HP section with a modified design that improves performance and reliability. This modification in and of itself will not increase plant capacity, but will instead lower emissions due to decreased fuel use from the resulting increased performance.

Combined improvements to other areas of the plant will increase plant generating capacity. These modifications consist of "de-bottlenecking" critical points that presently prevent the full utilization of present equipment. Other changes are needed for reliability, performance and/or routine maintenance purposes. See Item 8 for details.

(2) **EMISSION CHARACTERISTICS:** The composition and physical characteristics of the emissions are expected to change as a result of the proposed modifications as indicated in the attached spreadsheet (Attachment 1), which shows the anticipated changes in emission rates, temperature, air contaminant types, and concentration of air contaminants. The mass flow of chimney effluent may change proportionately with the fuel usage and combustion at a heat input comparable to the current heat input. The existing pollution control devices include low-NOx burners, fabric filters and wet scrubbers.

(3) **POLLUTION CONTROL DEVICE DESCRIPTION:** The existing pollution control device equipment includes dual register low NOx burners, baghouse type fabric filters for particulate removal, and flue gas desulfurization scrubbers. The existing low NOx burners provide a nominal 60% reduction in potential combustion NOx formation, the baghouse filters operate at nominal 99.95% efficiency, and the wet scrubbers operate at nominal 90% efficiency. Control equipment for the handling and transfer of solid material include dust collection filters.

The project includes modifications to the flue gas flow through scrubber modules to enhance $SO_2$ and acid gas removal rates. Also, the project includes installation of moderately improved NOx controls, such as the replacement of the existing dual register low NOx burners with new technology staged combustion low NOx burners.

(4) **EMISSION POINT:** The present emission point for the IGS boilers is a lined chimney that discharges at 712 feet above ground level (5386 feet above sea level). The chimney location is 39° 39' 39" longitude, 112° 34' 46" latitude (UTM 4374448 meters Northing, 364239 meters Easting.).

(5) **SAMPLING/MONITORING:** Emissions from boiler combustion are continuously sampled and monitored at the chimney for nitrogen oxides, sulfur oxides, carbon dioxide, and volumetric flow. Opacity is measured at the fabric filter outlet. Other parameters recorded include heat input and production level (megawatt load). Monitoring will remain unchanged. Other emissions not directly monitored are calculated using engineering judgement, emission factors, and fuel analyses. The type and location of the monitors will not be changed.

(6) **OPERATING SCHEDULE:** IGS operates 24 hours per day, seven days per week. This will not change as a result of the proposed modifications.

(7) **CONSTRUCTION SCHEDULE:** Construction of the modifications will be performed in a staged manner, generally following the attached schedule. (See Attachment 2.)

(8) **MODIFICATION SPECIFICATIONS:** The changes covered by this NOI include:

- **High Pressure Turbine Retrofit:**
The high pressure turbine on each unit at IGS is scheduled to be replaced with a current technology, high efficiency turbine. This unit will increase high pressure turbine efficiency from approximately 84% to over 92%. Additionally, the turbine will be sized to provide up to 8.6% additional output.

- **Cooling Tower Performance Upgrade:**
The cooling towers on each unit at IGS are scheduled for performance enhancement modifications to increase heat rejection capacity. Also, cooling tower transformers feeding the cooling tower fan motors will be upgraded. A study will be performed to identify and resolve needed redundancy issues for operation at new output levels.

- **Boiler Safety Valve Additions:**
Currently, a review is underway focusing on existing boiler safety valve capacity. Addition of one main steam safety valve on each unit is expected in order to address reliability concerns with the existing valves and to accommodate planned increase in generation capacity.

- **Generator Cooling Enhancement:**
An engineering evaluation is currently underway to identify any enhancements required on the generator in order to accommodate the planned 8.6% increase in generator output. The anticipated result of this evaluation is an upgrade to the current generator and stator cooling systems.

- **Isophase Bus Cooling Enhancement:**
An engineering evaluation is currently underway to identify any enhancements required on the 26kv generator electrical bus feeding the main step-up transformer. The anticipated result of this evaluation is an upgrade to the current isophase bus duct cooling systems.

- **Large Motor Bus Loading Equalization:**
An engineering evaluation is currently underway to equalize the loading between the large and small motor bus. Due to limited tap adjustment capability on the auxiliary transformers feeding these load centers, several motors must be moved from one supply to the other in order to maintain required motor terminal voltages as unit output is increased.

- **Boiler Feed Pump Performance Upgrade:**
The boiler feed pump manufacturer has notified IPSC of several enhancements they now offer that address previous reliability concerns and allow for small increases in output. These include, improved bearing housings, flow path smoothing, and impeller clearance modifications. These modifications provide for increased pump output at acceptable reliability levels.

- **Main Step-up Transformer Cooling:**
The step-up transformer cores currently run close to their nominal temperature ratings when ambient temperatures are high. Proposed modifications are directed at increasing the cooling system capacity for cooling the transformer oil, core, and housing.

- **NOx Reduction Project:**
Some moderate NOx control systems will be added or enhanced. Recent advances in the burner industry have resulted in published operational data with improved NOx removal efficiencies. Within this project, burners in Unit 1 may be replaced with latest technology LNBs. Following successful testing, Unit 2 burner replacements would follow in successive outage upgrades. Alternatively, we may look at other technologies, or a combination of commercially available control systems. The installation of moderate NOx controls is expected to prevent any significant net increases of NOx due to increased capacity.

- **Scrubber Wall Ring:**
Scrubber wall ring technology has been developed and patented in recent years to address inefficient flow patterns that routinely develop within the absorber vessels. This ring would be installed within all twelve (12) scrubber absorber vessels to move flow back to the center of the vessel, providing more efficient $SO_2$ and acid gas scrubbing of the flue gas.

- **Generator Stator Cooling Water Oxygen Monitoring System:**
Given concerns in recent years regarding the long term integrity of the generator stator bars, an oxygen monitoring system, capable of early identification of stator bar degradation is essential. As load increases, stator bar temperature and cooling flow velocities are also expected to rise. This system will guard against unexpected degradation of the stator.

- **High Pressure Heater Drain Line Modifications:**
An existing resonant vibration occurring in the high pressure heater drain line to the deaerator has become an increasing concern. The vibration appears to increase with load. An increase in unit output would require a modification to eliminate this concern.

- **Boiler Modifications:**
A comprehensive study is currently underway with the manufacturer of the boilers (Babcock & Wilcox). This study has been designed to review all aspects of boiler operation at the new turbine output levels. This study includes evaluation of current technologies and operating practices for minimizing emissions. The study will provide recommendations for modifying the existing boilers for stable and efficient operation at the new higher rating.

- **Circulating Water Makeup Modifications:**
Current circulating water makeup capacity is inadequate for increased unit production. A new design will support increased makeup requirements and return a degree of redundancy to the system, as originally designed.

- **Boiler and turbine control system logic software & controls:**
Upgrade of the existing control system includes complete replacement of the plant information system, control system simulator, coordinated control system, turbine control systems, combustion control systems and the alarm indication system. The new control systems will eliminate parts availability and reliability issues as well as providing the increased control system capacity required for the projects associated with the increased unit output. Boiler and turbine operating parameters are controlled within closer tolerances, resulting in less upsets and better emission control.

The capital expenditures for these changes to both units is expected to be about $35 million. More detailed engineering specifications and project descriptions can be provided as needed.

PRODUCTION SUMMARY: The proposed project will increase generation capacity from 875 to approximately 950 MWhe, with steam flow design increasing from 6.2 to 6.9 million pounds per hour. Design heat input will increase from 8,352 to 9,225 million BTU per hour, requiring an increase from 5.3 to 5.6 million tons of coal each year. See Attachment 1 for details.

- **ADDITIONAL INFORMATION:** IGS operates under a Title V permit (#2700010001). IPSC intends to continue to operate in full compliance with that permit and applicable requirements. No deviations from permit conditions are expected. IPSC requests that this NOI also be considered a request for revision of the Title V permit, and requests that the conditions of the approval order be incorporated into the Title V permit once the approval order is issued.

**Operating Flexibility**
IPSC reserves the right to cancel any and all planned modifications at any time. IPSC may only install the turbine dense packs, which by themselves would not require review as a major modification. We note that EPA has previously determined that enhancements like the Dense Pack project are not major modifications if there is no significant net increase in emissions. (See letter from Francis X. Lyons, Regional Administrator, EPA Region 5 to Henry Nickel of Hunton & Williams, dated 5/23/00.) If IPSC decides to install only the Dense Pack enhancements and certain upgrades for reliability, IPSC will provide the supporting information to show that there will be no significant net increase in emissions.

**Phased Permitting**
Due to the length and intermittent nature of the construction schedule for the proposed modifications, IPSC requests that the approval order contain terms that take into account the phases of installation. For example, due to lead times for engineering and budgeting, some portions of the project which affect capacity and/or emissions may be installed prior to upgrades in pollution control equipment. IPSC would be receptive to an approval order that includes interim emission limits for the period prior to project completion and final upgrades to control equipment.

**Permit "Off Ramps"**
Budgeting for the proposed project will be considered on a fiscal year-by-year basis. Although the current business climate for increased capacity is very favorable for this project, outlooks may change. Accordingly, IPSC proposes that the approval order contain conditions which provide that pollution control upgrades will be required only if those "debottlenecking" projects go forward which, if installed without controls, would increase the potential to emit enough to require major modification review. If IPSC decides not to complete certain portions of this project, the approval order should be structured so that IPSC is not forced to proceed with project completion.

**NSPS/PSD Applicability**

**New Source Performance Standards (NSPS).** The proposed modifications do not trigger NSPS applicability under 40 CFR Part 60, Subpart Da. NSPS pollutants for this facility are NOx, $SO_2$ and PM10. A modification is defined for NSPS purposes to include any change in operation of a source that increases the maximum hourly emissions of a Part 60 regulated pollutant above the maximum achievable rate during the previous five years. See 40 CFR 60.14(h).

**Prevention of Significant Deterioration.** Planned upgrades to pollution control equipment as part of this proposed modification will result in net emissions decrease for certain criteria pollutants as a result of the project. Other pollutants may have increases below PSD significant levels. Accordingly, this modification will not require a major modification review. IPSC is providing to the DAQ supporting calculations and operating data.

Should you require any additional information, please contact Mr. Dennis Killian, Superintendent of Technical Services, at (435) 864-4414, or dennis-k@ipsc.com.

In as much as this notice of intent also constitutes a request for revision of IPSC's Title V Operating Permit, I hereby certify that, based on information and belief formed after reasonable inquiry, the statements and information in this document and the accompanying attachments are true, accurate, and complete.

Cordially,

S. Gale Chapman

S. Gale Chapman
President, Chief Operations Officer, and Title V Responsible Official

Attachments: Excel Spreadsheets (Emissions)
Time Line Project Gantt Chart
IPSC Check, $1,200.00 NOI Fee

cc: Blaine Ipson, IPSC
Jerry Hintze, IPSC
Bruce Moore, LADWP CES
Mike Nosanov, LADWP
Krishna Nand, Parsons Engineering
Reed Searle, IPA
Lynn Banks, IPSC
James Nelson, IPSC
Tim Conkin, LADWP CES
John Schumann, LADWP
James Holtkamp, LLG&M

| [redacted] | | | | | | | ATTACHMENT 1: Worksheet A | |
|---|---|---|---|---|---|---|---|---|
| NOI / PSD Calculations | | | | | | | | |
| | | | | | | | | |
| **Operating & Production** | | | | | | | | |
| Parameter | Average Value | UoM | Post-Change Value | | | | | |
| Rated Output | 875 | Mwhe | 950 | | | | | |
| Fuel Use (Coal) | 5,264,292 | tons/yr | 5,578,473 | | | | | |
| Plant Operating Time | 16,386 | Unit hours | 16,386 | | | | | |
| Heat Value | 11,872 | BTU/lb | 11,872 | | | | | |
| Heat Input (Actual) | 7,628 | MMBtu/hr | 8,083 | | | | | |
| Heat Input (Design) | 8,352 | MMBtu/hr | 9,225 | | | | | |
| Heat Rate | 9,564 | Btu/KWhr | 9,475 | | | | | |
| Flow - Stack | 125,000,000 | scfh | 133,000,000 | | | | | |
| | | | | | | | | |
| **Emissions** | | | | | PSD Significance | PSD Major | Difference | PSD |
| Parameter/Pollutant | 2 Yr Average Value | UoM | Post-Change Value | Change+/- | Levels | Trigger Value | (Trigger - Post) | Triggered? |
| PSD | | | | | | | | |
| SO2 | 3586.31 | Tons | 3513.10 | -73.21 | 40 | 3626.31 | -113.21 | N |
| SO2 % Removal | 93.62 | % | 93.88 | | | | | |
| NOx | 25143.97 | Tons | 24346.10 | -797.87 | 40 | 25183.97 | -837.87 | N |
| CO | 1317.06 | Tons | 1394.60 | 77.54 | 100 | 1417.06 | -22.46 | N |
| PM10 | 273.77 | Tons | 283.51 | 9.75 | 15 | 288.77 | -5.25 | N |
| Lead | 0.087 | Tons | 0.123 | 0.036 | 0.600 | 0.687 | -0.564 | N |
| VOC | 12.65 | Tons | 13.40 | 0.75 | 40 | 52.65 | -39.25 | N |
| Beryllium | 0.0102 | Tons | 0.0014 | -0.0088 | 0.0004 | 0.0106 | -0.0092 | N |
| Mercury | 0.081 | Tons | 0.105 | 0.024 | 0.100 | 0.181 | -0.076 | N |
| Fluorides (HF) | 9.70 | Tons | 10.16 | 0.46 | 3 | 12.70 | -2.54 | N |
| Sulfuric Acid | 4.06 | Tons | 4.05 | -0.01 | 7 | 11.06 | -7.01 | N |

| PSD / NSPS Observations | | | | | | | | | | ATTACHMENT 1: Worksheet B | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] | | | | | | | | | | | |
| | SO2 (tons) | SO2 % Removal | Nox (tons) | CO (tons) | PM10 (tons) | Lead (lbs) | VOC (lbs) | Beryllium (lbs) | Mercury (lbs) | Fluorides (HF) (lbs) | Sulfuric Acid (lbs) |
| 1996 | 3759 | 92.28 | 19688 | 1080 | 83 | 224 | | 3.57 | 270 | 19139 | * |
| 1997 | 5076 | 92.05 | 22675 | 1291 | 108 | 263 | | 4.17 | 323 | 22905 | * |
| 1998 | 4281 | 92.67 | 25708 | 1321 | 114 | 167 | | 2.23 | 331 | 23436 | 8440 |
| 1999 | 3698 | 93.57 | 24179 | 1312 | 249 | 156 | 25394 | 2.18 | 123 | 19167 | 8234 |
| 2000 | 3474 | 93.67 | 26109 | 1322 | 299 | 191 | 25204 | 1.89 | 201 | 19621 | 8015 |
| 5 Year Avg | 4058 | 92.8 | 23672 | 1265 | 171 | 200 | 25299 | 2.81 | 250 | 20854 | 8230 |
| Last 2 yr Avg | 3586 | 93.6 | 25144 | 1317 | 274 | 174 | 25299 | 2.03 | 162 | 19394 | 8124 |
| TRIGGER: Average + Sig. Incr. | 3626 | | 25184 | 1417 | 289 | 1374 | 105299 | 2.83 | 362 | 25394 | 22124 |
| Projected Actuals: | 3513 | 93.88 | 24346 | 1395 | 284 | 245 | 26809 | 2.76 | 211 | 20313 | 8108 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Maximum NOx | Maximum SO2 |
| [illegible] | | Plant Operating | Btu/lb | MBTU/hr | LB/MMBtu | lbs/hr | LB/MMBtu | lbs/hr | | Emission Rate | Emission Rate |
| | Coal Usage (tons) | Hours | Coal HV | Avg Heat Input | NOx Emission rate | NOx Emission Rate | SO2 Emission Rate | SO2 Emission Rate | | (Last 5 years) | (Last 5 years) |
| 1996 | 4310562 | 15359 | 11860 | 6657 | 0.39 | 2564 | 0.07 | 489 | | 6045 | 1150 |
| 1997 | 5158867 | 16564 | 11789 | 7343 | 0.37 | 2738 | 0.08 | 613 | | 4875 | 1333 |
| 1998 | 5278344 | 16683 | 11823 | 7481 | 0.41 | 3082 | 0.07 | 513 | | 5331 | 1279 |
| 1999 | 5244793 | 16462 | 11858 | 7556 | 0.39 | 2938 | 0.06 | 449 | | 5007 | 1456 |
| 2000 | 5283790 | 16309 | 11885 | 7701 | 0.42 | 3202 | 0.06 | 426 | | 5441 | 1379 |
| 5 Year Avg | 5055271 | 16275 | 11843 | 7348 | 0.39 | 2905 | 0.07 | 498 | **Max.-Prev. 5 yrs.** | 6045 | 1456 |
| Last 2 Year Avg | 5264292 | 16386 | 11872 | 7628 | 0.40 | 3070 | 0.06 | 438 | **Proposed Average:** | 2972 | 429 |
| Projected Actuals: | 5578473 | 16386 | 11843 | 8064 | 0.37 | 2972 | 0.05 | 429 | **Proposed Max:** | 4613 | 1384 |

| OPERATING CHANGES | Actual | Design | | | | | |
|---|---|---|---|---|---|---|---|
| | Max Heat Input | Max Heat Input (MMBtu/hr) | Fuel Use (coal, tons) | Heat Rate | Mlbs/hr Steam | Mwhe | Stack Flow (scfh) |
| Present Operation | 7628 | 8352 | 5264291.5 | 9564 | 6.1 | 875 | 125,000,000 |
| Proposed Operation | 8083 | 9225 | 5,578,473 | 9475 | 6.9 | 950 | 133,000,000 |

ASSUMPTIONS:

All increases / decreases based on coal use only. Fuel oil & other bulk chemical chemical use not expected to change.
Estimated 15% nominal reduction with new NOx controls over old.
Estimated 4% nominal removal efficiciency improvement in scrubber efficiency.
HAPs PSD triggers calculated per UDAQ Dispersion Modeling Guidelines at R307-410-4.
VOC's calculated from HAPs list.
Projected nominal efficiency improvement: 8.0%
Projected nominal capacity improvement: 8.6%
Projected heat input / coal usage increase: 5.9%
Projected uncontrolled NOx increase: 11.2%

**ATTACHMENT 1**: Worksheet C

| HAPs / Other Projection Diff - COAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| POLLUTANT | Concentration (ppm) | Pollutant Emission Factor (lbs/10^12 Btu) | Release Rate | ACGIH TLV | Units | ETF | ETV | TSL | Difference | Modeling Review? |
| [illegible] | | | | | | | | | | |
| Anitmony | 3.1 | 0.92*(C/A*P | 0.0002725 | 0.5 | mg/m3 | 0.368 | 0.184 | 0.016666667 | -0.1837275 | |
| Arsenic | 12 | 3.1*(C/A*P | 0.001230335 | 0.01 | mg/m3 | 0.123 | 0.00123 | 0.000111111 | 3.34976E-07 | Y |
| Barium | 113 | (C | 0.010102368 | | | | | | | |
| Beryllium | 0.38 | 1.2*(C/A* | 1.22205E-05 | 0.002 | mg/m3 | 0.123 | 0.000246 | 2.22222E-05 | -0.00023378 | |
| Cadmium | 0.66 | 3.3*(C/A* | 0.000887876 | 0.01 | mg/m3 | 0.123 | 0.00123 | 0.000111111 | -0.000342124 | |
| Chromium | 24 | 3.7*(C/A*P | 0.002617514 | 0.05 | mg/m3 | 0.123 | 0.00615 | 0.000555556 | -0.003532486 | |
| Cobalt | 2.9 | 1.7*(C/A*P | 0.000508172 | 0.02 | mg/m3 | 0.368 | 0.00736 | 0.000666667 | -0.006851828 | |
| Copper | 7.8 | (C | 0.000817929 | | | | | | | |
| Lead | 7.1 | 3.4*(C/A*P | 0.002259576 | 0.05 | mg/m3 | 0.368 | 0.0184 | 0.001666667 | -0.016140424 | |
| Manganese | 9.9 | 3.8*(C/A*P | 0.003322407 | 0.1 | mg/m3 | 0.368 | 0.0368 | 0.003333333 | -0.033477593 | |
| Mercury | 0.061 | | 0.002975759 | 0.025 | mg/m3 | 0.368 | 0.0092 | 0.000833333 | -0.006224241 | |
| Nickel | 4.7 | 4.4*(C/A*P | 0.000364871 | 0.1 | mg/m3 | 0.368 | 0.0368 | 0.003333333 | -0.036435129 | |
| Selenium | 2.4 | | -8.977E-05 | 0.2 | mg/m3 | 0.368 | 0.0736 | 0.006666667 | -0.07368977 | |
| Vanadium | 5.6 | (C | -0.044629974 | | | | | | | |
| Zinc | 7.4 | (C | 0.000372181 | | | | | | | |
| | | | | | | | | | | |
| [illegible] | | | | | | | | | | |
| Acenaphthene | | 0.00000051 ( | 9.77863E-06 | | | | | | | |
| Acenaphthylene | | 2.5E-07 ( | 4.79344E-06 | | | | | | | |
| Acetaldehyde@ | | 0.00057 ( | 0.010929053 | 25 | ppm C | 0.31 | 13.96267894 | 4.50408998 | -13.95174988 | |
| Acetophenone@ | | 0.000015 ( | 0.000287607 | 10 | ppm | 0.368 | 18.08392636 | 1.63803681 | -18.08363877 | |
| Acrolein@ | | 0.00029 ( | 0.005560395 | 0.1 | ppm C | 0.31 | 0.071078119 | 0.022928425 | -0.065517723 | |
| Anthracene | | 0.00000021 ( | 4.02649E-06 | | | | | | | |
| Benzene@ | | 3.8 (lbs/10^1 | 0.00171811 | 0.5 | ppm | 0.368 | 0.587821677 | 0.053244717 | -0.586103567 | |
| Benzo(a)anthracene | | 8.0E-08 ( | 1.5339E-06 | | | | | | | |
| Benzo(a)pyrene | | 0.0018 (lbs/10^1 | 8.13841E-07 | | | | | | | |
| Benzo(b,j,k)Fluoranthene | | 1.1E-07 ( | 2.10912E-06 | | | | | | | |
| Benzo(g,h,i)perylene | | 2.7E-08 ( | 5.17692E-07 | | | | | | | |
| Benzyl chloride@ | | 0.0007 ( | 0.013421843 | 1 | ppm | 0.368 | 1.90517137 | 0.17256987 | -1.891749727 | |
| Biphenyl@ | | 0.0000017 ( | 3.25954E-05 | 0.2 | ppm | 0.368 | 0.464176687 | 0.04204499 | -0.464144092 | |
| Bis(2-ethylhexyl)phthalate (DEHP)@ | | 0.000073 ( | 0.001399686 | | | | | | | |
| Bromoform@ | | 0.000039 ( | 0.000747777 | 0.5 | ppm | 0.368 | 1.902462168 | 0.172324472 | -1.90171439 | |
| Carbon disulfide@ | | 0.00013 ( | 0.002492591 | 10 | ppm | 0.368 | 11.45992636 | 1.03803681 | -11.45743379 | |
| 2-Chloroacetophenone@ | | 0.000007 ( | 0.000134218 | 0.05 | ppm | 0.368 | 0.116337669 | 0.010537832 | -0.118203452 | |
| Chlorobenzene@ | | 0.000022 ( | 0.000421823 | 10 | ppm | 0.368 | 16.94154601 | 1.534560327 | -16.94112419 | |
| Chloroform@ | | 0.000059 ( | 0.001131253 | 10 | ppm | 0.368 | 17.96803272 | 1.627539196 | -17.96690147 | |
| Chrysene | | 0.0000001 ( | 1.91738E-06 | L | ppm | 0.368 | #VALUE! | #VALUE! | #VALUE! | |
| Cumene@ | | 0.0000053 ( | 0.000101621 | 50 | ppm | 0.368 | 90.44973415 | 8.192910702 | -90.44963253 | |
| Cyanide | | 0.0025 ( | 0.047934441 | | | | | | | |
| 2,4-Dinitrotoluene@ | | 0.00000028 ( | 5.36866E-06 | | | | | | | |
| Dimethyl sulfate@ | | 0.000048 ( | 0.000920341 | 0.1 | ppm | 0.368 | 0.189794683 | 0.017191547 | -0.188874342 | |
| Ethyl benzene@ | | 0.000094 ( | 0.001802335 | 100 | ppm | 0.368 | 159.7827403 | 14.4730743 | -159.780936 | |
| Ethyl chloride@ | | 0.000042 ( | 0.000805299 | 100 | ppm | 0.368 | 97.10985685 | 8.796182686 | -97.10905155 | |
| Ethylene dichloride@ | | 0.00004 ( | 0.000766951 | 10 | ppm | 0.368 | 14.89459305 | 1.349147921 | -14.8938261 | |
| Ethylene dibromide@ | | 0.0000012 ( | 2.30085E-05 | L | ppm | 0.368 | #VALUE! | | | |
| Fluoranthene | | 0.00000071 ( | 1.36134E-05 | | | | | | | |
| Fluorene | | 9.1E-07 ( | 1.74481E-05 | | | | | | | |
| Formaldehyde@ | | 3.0 (lbs/10^1 | 0.001356402 | 0.3 | ppm | 0.123 | 0.04532135 | 0.00409407 | -0.043964947 | |
| Hexane@ | | 0.000067 ( | 0.001284643 | 500 | ppm | 0.368 | 648.5529652 | 58.7457396 | -648.5516806 | |
| Indeno(1,2,3-cd)pyrene | | 6.1E-08 ( | 1.1696E-06 | | | | | | | |
| Isophorone@ | | 0.00058 ( | 0.01112079 | 5 | ppm | 0.31 | 8.761779141 | 2.826380368 | -8.750658351 | |
| Methyl bromide@ | | 0.00016 ( | 0.003067804 | 1 | ppm | 0.368 | 1.429104294 | 0.129447853 | -1.42603649 | |
| Methyl chloride@ | | 0.00053 ( | 0.010162101 | 50 | ppm | 0.368 | 37.99656442 | 3.441717791 | -37.98640232 | |
| 5-Methyl chrysene | | 2.2E-08 ( | 4.21823E-07 | | | | | | | |
| Methyl ethyl ketone@ | | 0.00039 ( | 0.007477773 | 200 | ppm | 0.368 | 217.0372188 | 19.65916837 | -217.029741 | |
| Methyl hydrazine@ | | 0.00017 ( | 0.003259542 | 0.01 | ppm | 0.368 | 0.006934053 | 0.000628085 | -0.003674511 | |
| Methyl methacrylate@ | | 0.00002 ( | 0.000363478 | 50 | ppm | 0.368 | 75.35345603 | 6.825494206 | -75.35307256 | |
| Methyl tert butyl ether@ | | 0.000035 ( | 0.000671082 | 40 | ppm | 0.368 | 53.08230675 | 4.808179959 | -53.08163567 | |
| Methylene chloride | | 0.00029 ( | 0.005560395 | 50 | ppm | 0.368 | 63.91460123 | 5.789366053 | -63.90904083 | |
| Naphthalene@ | | 0.000013 ( | 0.000249259 | 10 | ppm | 0.368 | 19.29403681 | 1.747648262 | -19.29378755 | |
| Phenanthrene | | 0.0000027 ( | 5.17692E-05 | | | | | | | |
| Phenol@ | | 0.000016 ( | 0.00030678 | 5 | ppm | 0.368 | 7.082306748 | 0.641513292 | -7.081999968 | |
| Propionaldehyde@ | | 0.00038 ( | 0.007286035 | | | | | | | |
| Pyrene | | 0.00000033 ( | 6.32735E-06 | | | | | | | |
| Tetrachloroethylene | | 0.000043 ( | 0.000824472 | 25 | ppm | 0.368 | 62.38691207 | 5.650989412 | -62.38608759 | |
| Toluene@ | | 1.4 (lbs/10^12 | 0.000632988 | 50 | ppm | 0.368 | 69.33300613 | 6.280163599 | -69.33237315 | |
| 1,1,1-Trichloroethane | | 0.00002 ( | 0.000383476 | 350 | ppm | 0.368 | 702.8423722 | 63.66325835 | -702.8419887 | |
| Styrene@ | | 0.000025 ( | 0.000479344 | 20 | ppm | 0.368 | 31.35450307 | 2.8400818 | -31.35402372 | |
| Xylenes@ | | 0.000037 ( | 0.00070943 | 100 | ppm | 0.368 | 159.7827403 | 14.4730743 | -159.7820309 | |
| Vinyl acetate@ | | 0.0000076 ( | 0.000145721 | 10 | ppm | 0.368 | 12.95751329 | 1.173687798 | -12.95736757 | |
| [illegible] | | | | | | | | | | |
| Total PCDD/PCDF | | 0.000002 (lbs/10^12 | 9.04268E-10 | | | | | | | |
| | | | | | | | | | | |
| [illegible] | | | | | | | | | | |
| Hydrogen Chloride | 299 | | 0.009981802 | | | | | | | |
| Hydrogen Fluoride | 63 | | 0.056113641 | | | | | | | |
| Sulfuric Acid | 0.50% | 0.0646 (lb | 0.000180978 | | | | | | | |

[illegible]

(1) By ash fraction derivative
(2) By stack test
(3) By EPRI's Trace Report
(4) By SoCo's Paper

Realized HAP emission increases calculated per Utah R307-410-4.
To convert ppm to mg/m3: TLV(ppm) X MW / 24.45
z = Impact (acute/chronic/carcinogenic)
ETF = Emission Threshold Factor (Table IV-2, R307-410-4, Boundaries >100m)
TLV = Threshold Limit Values (ACGIH 2001 version)
ETV = Emission Threshold Value ( [lb/hr] = [TLV] X [ETF] )
TSL = Toxic Screening Level ( TLV/z)
MW = Atomic molecular weight of compound
@ = VOC

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **HP TURBINE DENSE PACK SO2 PROJECTIONS** | | | | | | **ATTACHMENT 1**: Worksheet D | | |
| | 99-00 Average lbs/mmbtu | | | | | | | | |
| | inlet | stack | % reduction | | | | | | |
| | **0.7744** | **0.0494** | **93.6209** | | U1/U2 '99-00 average | | | | |
| | 0.7744 | **0.0474** | 93.8760 | | 4% reduction stack lbs/mmbtu | | | | |
| | 0.7744 | 0.0204 | **97.3657** | | 97.3657% reduction (4% increase in scrubber efficiency) | | | | |
| | **1999** | | | | | | | | |
| | **Unit One** | | | | **Unit Two** | | | | |
| | Coal Burned (tons) | 2,472,213 | | | Coal Burned (tons) | 2,772,580 | | | |
| | Heating Value btu/lb | 11,858 | | | Heating Value btu/lb | 11,858 | | | |
| | Inlet SO2 lbs/mmbtu | 0.7963 | | | Inlet SO2 lbs/mmbtu | 0.7867 | | | |
| | Stack SO2 lbs/mmbtu | 0.0479 | | | Stack SO2 lbs/mmbtu | 0.0538 | | | |
| | Inlet Tons SO2 | 23,343.93 | | | Inlet Tons SO2 | 25,864.54 | | | |
| | Stack Tons SO2 | 1,404.21 | [redacted] | | Stack Tons SO2 | 1,768.80 | [redacted] | | |
| | % Removal (lbs/mmbtu) | 93.9847 | | | % Removal (lbs/mmbtu) | 93.1613 | | | |
| | % Removal (tons) | 93.9847 | | | % Removal (tons) | 93.1613 | | | |
| | % Removal (EDR tons) | 93.2899 | 0.69 | | % Removal (EDR tons) | 91.7578 | 1.40 | | |
| | **2000** | | | | | | | | |
| | **Unit One** | | | | **Unit Two** | | | | |
| | Coal Burned (tons) | 2,799,081 | | | Coal Burned (tons) | 2,484,709 | | | |
| | Heating Value btu/lb | 11,885 | | | Heating Value btu/lb | 11,885 | | | |
| | Inlet SO2 lbs/mmbtu | 0.7712 | | | Inlet SO2 lbs/mmbtu | 0.7432 | | | |
| | Stack SO2 lbs/mmbtu | 0.0482 | | | Stack SO2 lbs/mmbtu | 0.0477 | | | |
| | Inlet Tons SO2 | 25,655.57 | | | Inlet Tons SO2 | 21,947.27 | | | |
| | Stack Tons SO2 | 1,603.47 | [redacted] | | Stack Tons SO2 | 1,408.62 | [redacted] | | |
| | % Removal (lbs/mmbtu) | 93.7500 | | | % Removal (lbs/mmbtu) | 93.5818 | | | |
| | % Removal (tons) | 93.7500 | | | % Removal (tons) | 93.5818 | | | |
| | % Removal (EDR tons) | 92.7692 | 0.98 | | % Removal (EDR tons) | 92.6223 | 0.96 | | |
| | **1999-2000 Average Intermountain Generating Station** | | | | | | | | |
| | % Removal (lbs/mmbtu) | 93.6194 | | | Inlet lbs/mmbtu | [redacted] | | | |
| | % Removal (tons) | 93.6194 | | | Stack lbs/mmbtu | **0.0494** | | | |
| | % Removal (EDR tons) | 92.6098 | 1.01 | | | | | | |
| | **Dense Pack - Intermountain Generating Station** | | | | | | | | |
| | PREMODIFICATION | 1999 - 2000 Average (calculated) | | | **POST MODIFICATION (W/O Scrubber Modification)** | | | | |
| | Coal Burned (tons) | 5,268,249 | | | Coal Burned (tons) | 5,578,473 | | | |
| | Heating Value btu/lb | 11,871 | | | Heating Value btu/lb | 11,871 | | | |
| | Inlet SO2 lbs/mmbtu | [redacted] | | | Inlet SO2 lbs/mmbtu | [redacted] | | | |
| | Stack SO2 lbs/mmbtu | **0.0494** | | | Stack SO2 lbs/mmbtu | **0.0494** | | | |
| | Inlet Tons SO2 | 48,430.50 | 54,170.45 | Actual | Inlet Tons SO2 | 51,282.36 | 57403.69 | Actual Projected | |
| | Stack Tons SO2 | 3,089.45 | [redacted] | (EDR) | Stack Tons SO2 | 3,271.37 | [redacted] | (EDR Projected) | |
| | % Removal (lbs/mmbtu) | 93.6209 | 93.38 | | % Removal (lbs/mmbtu) | 93.6209 | 93.68 | | |
| | | | | | **POST MODIFICATION (W/Scrubber Modification)** | | | | |
| | | Tons of SO2 Reduction | | | 4% reduction stack lbs/mmbtu | | | | |
| | | 130.85 | | | Coal Burned (tons) | 5,578,473 | | | |
| | | [redacted] | (EDR Projected) | | Heating Value btu/lb | 11,871 | | | |
| | | | | | Inlet SO2 lbs/mmbtu | [redacted] | | | |
| | | | | | Stack SO2 lbs/mmbtu | **0.047424** | | | |
| | | | | | Inlet Tons SO2 | 51,282.36 | 57403.69 | Actual Projected | |
| | | | | | Stack Tons SO2 | 3,140.51 | [redacted] | (EDR Projected) | |
| | | | | | % Removal (lbs/mmbtu) | 93.8760 | 93.88 | | |
| | | | | | **POST MODIFICATION (W/Scrubber Modification)** | | | | |
| | | Tons of SO2 Reduction | | | 97.3657% reduction (4% increase in scrubber efficiency) | | | | |
| | | 1,920.44 | | | Coal Burned (tons) | 5,578,473 | | | |
| | | [redacted] | (EDR Projected) | | Heating Value btu/lb | 11,871 | | | |
| | | | | | Inlet SO2 lbs/mmbtu | [redacted] | | | |
| | | | | | Stack SO2 lbs/mmbtu | **0.0204** | | | |
| | | | | | Inlet Tons SO2 | 51,282.36 | 57403.69 | Actual Projected | |
| | | | | | Stack Tons SO2 | 1,350.93 | [redacted] | (EDR Projected) | |
| | | | | | % Removal (lbs/mmbtu) | 97.3657 | | | |
| NOTES: | | | | | | | | | |
| 1 | Stack SO2 tons calculated from lbs/mmbtu are less than SO2 tons calculated for EDR from CEM SO2 ppm and Stack flow. | | | | | | | | |
| 2 | Dense Pack SO2 tons are calculated from lbs/mmbtu. (yellow boxes) | | | | | | | | |

**ATTACHMENT 1**: Worksheet E

**CO Calculations**

| **Dense Pack - Intermountain Generating Station** | | | |
|---|---|---|---|
| PREMODIFICATION | 1999 - 2000 Average | POST MODIFICATION | |
| Coal Burned (tons) | 5,268,249 | Coal Burned (tons) | 5,578,473 |
| CO E.F. (lb/ton) | 0.50 | CO E.F. (lb/ton) | 0.50 |
| CO Emissons (tons) | 1317.06 | CO Emissons (tons) | 1394.62 |

Tons of CO increase
77.56

AP-42 Table 1.1-3

**DENSE PACK PM10**
**COAL USAGE CALCULATION SUMMARY**

ATTACHMENT 1: Worksheet F

**YEARLY INVENTORY**

| | |
|---|---|
| 5,578,473 | Tons coal received Railcar Unloading |
| 5,578,473 | Tons of coal fed to both Units |
| 2,789,237 | Tons of coal fed to Unit 1 |
| 2,789,237 | Tons of coal fed to Unit 2 |
| 11,800 | Coal heating value (Btu/lb) |
| 25.1 | Coal pile (acres) |
| 0.0056 | Unit 1 Particulate lbs/mmbtu (tsp) |
| 0.0036 | Unit 2 Particulate lbs/mmbtu (tsp) |

**UNIT 1 FABRIC FILTER PARTICULATE EMISSION (online)**
169.5677 TPY Particulate PM10 AP 42 Table 1.1-6

**UNIT 2 FABRIC FILTER PARTICULATE EMISSION (online)**
109.0078 TPY Particulate PM10 AP 42 Table 1.1-6

**COAL TRAIN UNLOADING DUST COLLECTORS A,B,C,D**
0.0625 TPY Particulate PM10

**COAL TRUCK UNLOADING DUST COLLECTOR**
0.0000 TPY Particulate PM10 Included in train unloading

**COAL RESERVE RECLAIM DUST COLLECTOR**
0.0020 TPY Particulate PM10 10% of Coal Crusher Emissions

**COAL SAMPLE PREPARATION DUST COLLECTOR**
0.0000 TPY Particulate PM10

**COAL TRANSFER BUILDING #1 DUST COLLECTOR**
0.0156 TPY Particulate PM10

**COAL TRANSFER BUILDING #2 DUST COLLECTOR**
0.0312 TPY Particulate PM10

**COAL TRANSFER BUILDING #4 DUST COLLECTOR**
0.0195 TPY Particulate PM10

**COAL CRUSHER BUILDING DUST COLLECTOR**
0.0195 TPY Particulate PM10

**ACTIVE COAL STACKOUT (fugitive)**
3.9049 TPY Particulate PM10

**DUST COLLECTOR 13A & 13B**
0.0312 TPY Particulate PM10

**DUST COLLECTOR 14A & 14B**
0.0156 TPY Particulate PM10

**COAL PILE FUGITIVE EMISSIONS**
0.8368 TPY Particulate PM10

**283.5145 TPY PM10 (COAL ONLY)**

COMMENTS
EF found in AP-42 Table 11.19.2-1 site dust collectors for coal, limestone, lime vacuum sys. and soda ash PM10 and PM2.5.
Using same ratio of PM10 to PM2.5 found with emissions at stack.
Use cumulative Mass % <= Stated Size in AP-42 Table 1.1-5 for percentages of PM10 and PM2.5 as a ratio of TSP.
PM10 = 92% of TSP
PM2.5 = 53% of TSP

ATTACHMENT 2

# IGS Uprate Project Coordination

| Task Name | Start | Finish |
|---|---|---|
| **Unit 2 Projects** | **1/2/2001** | **4/1/2004** |
| HP Turbine Retrofit | 1/15/2001 | 4/1/2002 |
| Cooling Tower Performance Upgrade | 2/1/2001 | 4/1/2004 |
| Boiler Safety Valve Addition | 4/2/2001 | 4/1/2002 |
| Generator Cooling Enhancements | 4/2/2001 | 4/1/2002 |
| Isophase Cooling Enhancements | 4/2/2001 | 4/1/2002 |
| Large Motor Bus Loading Equalization | 4/2/2001 | 4/1/2002 |
| Boiler Feed Pump Performance Upgrade | 1/2/2001 | 4/1/2003 |
| Main Step-up Transformer Cooling | 3/1/2001 | 4/1/2002 |
| NOx Reduction Project | 4/2/2001 | 4/1/2004 |
| Scrubber Wall Ring | 5/2/2001 | 4/2/2003 |
| Generator SCW O2 Monitoring | 4/2/2001 | 4/1/2002 |
| HP Heater Drain Line Mods | 4/2/2001 | 4/1/2002 |
| Boiler Modifications | 4/2/2001 | 4/1/2004 |
| Cooling Tower Makeup Modifications | 1/2/2002 | 4/1/2004 |
| Cooling Tower Electrical Redundancy | 1/2/2002 | 4/1/2004 |
| **Unit 1 Projects** | **1/2/2001** | **4/2/2003** |
| HP Turbine Retrofit | 1/15/2001 | 4/1/2003 |
| Cooling Tower Performance Upgrade | 2/1/2001 | 4/1/2003 |
| Boiler Safety Valve Addition | 3/1/2001 | 4/1/2003 |
| Generator Cooling Enhancements | 1/2/2002 | 4/2/2003 |
| Isophase Cooling Enhancements | 1/2/2002 | 4/2/2003 |
| Large Motor Bus Loading Equalization | 1/2/2002 | 4/1/2003 |
| Boiler Feed Pump Performance Upgrade | 1/2/2001 | 4/1/2003 |
| Main Step-up Transformer Cooling | 1/2/2002 | 4/1/2003 |
| NOx Reduction Project | 3/1/2001 | 4/1/2003 |
| Scrubber Wall Ring | 5/1/2001 | 4/1/2003 |
| Generator SCW O2 Monitoring | 1/2/2002 | 4/1/2003 |
| HP Heater Drain Line Mods | 4/2/2001 | 3/1/2002 |
| Boiler Modifications | 4/2/2001 | 4/1/2003 |
| Cooling Tower Electrical Redundancy | 1/2/2002 | 3/31/2003 |

Printed: 4/3/2001